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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,560	01/13/2004	Nelson Diaz	16274.170	7532

22913 7590 04/10/2007

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EXAMINER	
SINGH, DALZID E	
ART UNIT	PAPER NUMBER
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/756,560	DIAZ, NELSON	
	Examiner	Art Unit	
	Dalzid Singh	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19 and 21-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 21-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-19 and 21-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasper et al (US Pub. No. 2004/0208207) in view of Carvalho et al (US Pub. No. 2006/0226930).

Regarding claim 1, a transmitter in a fiber optic system, the transmitter (as shown in Fig. 2) comprising:

a driver circuit (16) configured to receive a modulated electrical signal (from data source) and to have a driver circuit output impedance (it is well known that driver circuit have output impedance);

a light emitting source (18) having a light emitter impedance (it is well known that driver circuit have output impedance) different than the driver circuit output impedance, the light emitting source configured to receive the modulated electrical signal such that it produces a modulated optical signal proportional to modulated electrical signal; and

transmission lines having a length between a first end and a second end, the transmission lines coupled to the driver circuit at the first end and to the light emitting

source at the second end such that the transmission lines transmit the modulated electrical signal from the driver circuit to the light emitting source (see paragraph [0023-0028]).

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]). Kasper et al differ from the claimed invention in that Kasper et al do not disclose that the transmission lines configured such that impedance of the transmission lines gradually changes over the length so that the tapered transmission lines match the impedance of the driver circuit at the first end and match the impedance of the light emitter at the second end. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the length (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claims 2 and 16, wherein the tapered transmission lines gradually change the capacitance and impedance along the length such that the tapered

transmission lines gradually match the driver circuit output impedance at the first end to the light emitter impedance at the second end without use of lumped circuit components (see Fig. 1 and paragraph [0030]).

Regarding claim 3, wherein the tapered transmission lines comprise two lines spaced apart in a transmission plane, the transmission plane being located adjacent a ground plane (see Fig. 1 and paragraph [0030]).

Regarding claim 4, wherein the two lines are spaced apart from each other at the first end by a first distance and spaced apart from each other at the second end by a second distance, the first distance being greater than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 5, wherein the two lines are spaced apart from each other at the first end by a first distance and spaced apart from each other at the second end by a second distance, the first distance being less than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 6, wherein the lines in the transmission plane are spaced apart from the ground plane at the first end by a first distance and wherein the lines in the transmission plane are spaced apart from the ground plane at the second end by a second distance, the first distance being greater than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 7, wherein the lines in the transmission plane are spaced apart from the ground plane at the first end by a first distance and wherein the lines in the

transmission plane are spaced apart from the ground plane at the second end by a second distance, the first distance being less than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 8, wherein each of the lines has a varying diameter over the length of the transmission lines such that the diameters of the two lines at the first end are smaller than the diameters of the two lines at the second end (see Fig. 1 and paragraph [0030]).

Regarding claim 9, wherein each of the lines has a varying diameter over the length of the transmission lines such that the diameters of the two lines at the first end are larger than the diameters of the two lines at the second end (see Fig. 1 and paragraph [0030]).

Regarding claim 10, wherein the driver circuit output impedance is higher than the light emitter impedance (it is well known that the impedance of the light emitter is less than the driver circuit).

Regarding claim 11, the combination does not specifically disclose that the driver circuit output impedance is between 50 Ohms and 75 Ohms and the light emitter impedance is between 5 Ohms and 25 Ohms such that that transmission line impedance gradually changes over its length from between 50 Ohms and 75 Ohms to between 5 Ohms and 25 Ohms. However, it would have been obvious to provide impedance matching to the desired impedance of the driver circuit and the light emitter in order to reduce distortions.

Regarding claim 12, wherein the driver circuit is a laser driver circuit and the light emitter source is a laser diode (see Fig. 1 of Kasper et al).

Regarding claim 13, the combination differs from the claimed invention in that the combination does not disclose the driver circuit is a light emitting diode driver circuit and the light emitter source is a light emitting diode. However, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the laser and driver of Kasper et al with that of LED and its corresponding drivers.

Regarding claim 14, the combination does not specifically disclose that the driver circuit output impedance is 50 Ohms and the light emitter impedance is 5 Ohms and the transmission lines taper to gradually decrease impedance so as to match the driver circuit and the light emitter source. However, it would have been obvious to provide impedance matching to the desired impedance of the driver circuit and the light emitter in order to reduce distortions.

Regarding claim 15, Kasper et al disclose a fiber optic communication system, as shown in Fig. 1, comprising:

a signal transmitter that produces an optical signal of varying light intensity, the transmitter further comprising:

a driver circuit (16) configured to receive an original modulated electrical signal (from data source) and to generate a driver electrical signal, the driver circuit configured to have a driver circuit output impedance;

a light emitting source (18) having a light emitter impedance different than the driver circuit output impedance, the light emitting source configured to receive the original modulated electrical signal such that it produces the optical signal of varying light intensity that is proportional to the original modulated electrical signal; and

transmission lines coupled between the driver circuit and the light emitting source such that the transmission lines transmit the driver electrical signal from the driver circuit to the light emitting source (see paragraph [0023-0028]);

an optical fiber (20) coupled to the signal transmitter that receives and transmits the optical signal; and

a receiver (22) coupled to the optical fiber that receives the optical signal and converts the received optical signal into an output electrical signal that is a replica of the original modulated electrical signal.

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]). Kasper et al differ from the claimed invention in that Kasper et al do not disclose that the transmission lines configured such that impedance of the transmission lines gradually changes over the length so that the tapered transmission lines match the impedance of the driver circuit at the first end and match the impedance of the light emitter at the second end. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the

length (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claim 17, wherein the tapered transmission lines comprise two lines spaced apart from each other immediately adjacent the driver circuit by a first distance and spaced apart from each other immediately adjacent the light emitter by a second distance, the first distance being greater than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 18, wherein the tapered transmission lines comprise two lines spaced apart in a transmission plane, the transmission plane being located adjacent a ground plane and wherein the lines in the transmission plane are spaced apart from the ground plane immediately adjacent the driver circuit by a first distance and wherein the lines in the transmission plane are spaced apart from the ground plane immediately adjacent the driver circuit by a second distance, the first distance being greater than the second distance (see Fig. 1 and paragraph [0030]; it would have been obvious to replace the transmission lines of Kasper et al with that transmission lines of Carvalho et al; see claim 15).

Regarding claim 19, wherein the tapered transmission lines comprise two lines having varying diameter such that the diameters of the two lines immediately adjacent the driver circuit are smaller than the diameters of the two lines immediately adjacent the light emitting sources (see Fig. 1 and paragraph [0030]; it would have been obvious to replace the transmission lines of Kasper et al with that transmission lines of Carvalho et al; see claim 15).

Regarding claim 21, wherein a distance between the two lines changes exponentially from the first end to the second end (see paragraph [0040]).

Regarding claim 22, Kasper et al disclose transmitter, shown in Fig. 1, comprising:

a driver circuit (16) configured to receive a modulated electrical signal and to have a driver circuit output impedance;

a light emitting source (18) having a light emitter impedance different than the driver circuit output impedance, the light emitting source configured to receive the modulated electrical signal such that the light emitting source produces a modulated optical signal proportional to modulated electrical signal; and

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]).

Kasper et al differ from the claimed invention in that Kasper et al do not disclose that the transmission lines configured such that impedance of the transmission lines

gradually changes over the length so that the tapered transmission lines match the impedance of the driver circuit at the first end and match the impedance of the light emitter at the second end. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the length (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claim 23, wherein a change from the first distance to the second distance is substantially linear (see paragraph [0040] of Carvalho et al).

Regarding claim 24, wherein the first distance is greater than the second distance (see Fig. 1 and paragraph [0030] of Carvalho et al).

Regarding claim 25, Kasper et al disclose transmitter, as shown in Fig. 1, comprising:

a driver circuit (16) configured to receive a modulated electrical signal and to have a driver circuit output impedance;

a light emitting source (18) having a light emitter impedance different than the driver circuit output impedance, the light emitting source configured to receive the

modulated electrical signal such that the light emitting source produces a modulated optical signal proportional to modulated electrical signal; and

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]).

Kasper et al differ from the claimed invention in that Kasper et al do not disclose that the transmission lines configured such that impedance of the transmission lines gradually changes over the length so that the tapered transmission lines match the impedance of the driver circuit at the first end and match the impedance of the light emitter at the second end. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the length (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claim 26, wherein the first and second lines are spaced apart from each other such that a first distance between the respective first ends of the first and

second lines is different from a second distance between the respective second ends of the first and second lines (see Fig. 1 and paragraph [0030] of Carvalho et al).

Regarding claim 27, wherein the first distance is greater than the second distance (see Fig. 1 and paragraph [0030]).

Regarding claim 28, wherein the respective first ends of the first and second lines have relatively smaller cross-sectional areas than the respective second ends of the first and second lines (see Fig. 1 and paragraph [0030]).

Regarding claim 29, Kasper et al disclose transmitter, as shown in Fig. 1, comprising:

a driver circuit (16) configured to receive a modulated electrical signal and to have a driver circuit output impedance; and

a light emitting source (18) having a light emitter impedance different than the driver circuit output impedance, the light emitting source configured to receive the modulated electrical signal such that the light emitting source produces a modulated optical signal proportional to modulated electrical signal.

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]). Kasper et al differ from the claimed invention in that Kasper et al do not disclose that the transmission lines configured such that impedance of the transmission lines gradually changes over the length so that the tapered transmission lines match the

impedance of the driver circuit at the first end and match the impedance of the light emitter at the second end. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the length (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claim 30, Kasper et al disclose a transmitter, shown in Fig. 1, comprising:

a driver circuit (16) configured to receive a modulated electrical signal and to have a driver circuit output impedance; and

a light emitting source (18) having a light emitter impedance different than the driver circuit output impedance, the light emitting source configured to receive the modulated electrical signal such that the light emitting source produces a modulated optical signal proportional to modulated electrical signal.

Kasper et al disclose optical transmission system comprising transmission line connecting the driver and the laser and suggest the use of impedance matching resistors between the laser driver and laser diode (see paragraphs [002-00024]).

Kasper et al differ from the claimed invention in that Kasper et al do not disclose that a transmission line that includes first and second lines, and a ground plane having a first end and a second end, the ground plane being arranged such that a first distance between the ground plane and the transmission line at the driver circuit is different from a second distance between the ground plane and the transmission line at the light emitting source. Carvalho et al teach the use of tapered lines for impedance matching having the impedance of the transmission lines gradually changes over the length with ground plane (see Fig. 1 and paragraph [0030]). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to replace the transmission line or impedance matching resistors of Kasper et al with that of tapered transmission lines of Carvalho et al. One of ordinary skill in the art would have been motivated to provide such impedance matching transmission line in order to provide impedance matching devices with small geometrical devices which further provide improved operational bandwidths and low dispersion.

Regarding claim 31, wherein the first distance is greater than the second distance (see Fig. 1 and paragraph [0030]).

Response to Arguments

3. Applicant's arguments with respect to the claim have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DS
April 5, 2007

DALZID SINGH
PRIMARY EXAMINER
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